

HEAT EXCHANGE CATHETER WITH DISCRETE HEAT EXCHANGE ELEMENTS

5

Abstract of the Disclosure

10

15

20

23

A catheter for exchanging heat with a body fluid is disclosed. The catheter includes a main shaft and a heat exchange region having a plurality of heat exchange elements each having a length and opposed ends. Each of the elements is attached on at least one of its ends to the shaft and disposed so that when inserted in a fluid body cavity having body fluid therein, the body fluid may circumferentially surround each heat exchange element along a portion of the length of the heat exchange element. The catheter includes a fluid circulation path therein, which desirably includes the hollow lumen within each of heat exchange elements. The heat exchange elements may be connected at two points along the shaft using manifolds that are in fluid communication with fluid flow paths within the shaft. Alternatively, the heat exchange elements may be connected at only one point and be permitted to float in a proximal or distal direction with respect to the catheter. The heat exchange region may be formed on a distal portion of the catheter, or may be formed along the entire length thereof. In the former configuration, an insulating member, such as a balloon, may be provided along the shaft proximal to the heat exchange region. Ribs may be provided on each heat exchange element to disrupt flow therearound and increase heat exchange. Each of the heat exchange elements may be non-circular in cross-section, and may extend in an undulating path with respect to the catheter shaft.